

PATENT SPECIFICATION

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 (52) Index at acceptance

G1J 2C1A

(54) DEVICE FOR CONTINUOUSLY MONITORING THE FUNCTIONING
OF RECORDING MEANS IN A TACHOGRAPH

(71) We, KEINZLE APPARATE G.m.b.H.,
a German Body Corporate, of Villingen-
Schwenningen, Germany, do hereby declare
the invention, for which we pray that a
5 patent may be granted to us, and the method
by which it is to be performed, to be particularly
described in and by the following
statement:—

10 The invention relates to a device for monitoring the operation of recording means in a tachograph which is provided with means for supporting and guiding at least one time dependent drivable record carrier, and at least one elastically mounted recording pencil movable in a direction normal to the record carrier when the latter is supported by said support means. According to Patent Specification No. Application 50877/74 (Serial No. 1,454,948) the pressure
 15 sensitive member is actuated indirectly — via the diagram disk — and delivers a signal current depending on the pressure exerted by the recording pencil on the diagram disk.

20 According to the above mentioned parent application a device for continuously monitoring the functioning of recording means in a tachograph was to be designed avoiding the disadvantages of known monitoring devices. Such known monitoring devices are for instance a device for immediately observing the recording position of the pencils due to the transparency of the record carrier or due to an optical deflection and indication thereof. In another device an electrically
 25 conductive special diagram disk is used necessitating electrical connections to the recording pencils. It was one of the objects of the parent application to design a monitoring device which apart from being suited for the series mounting also allows for a simple modification and or a later addition to such tachographs which are already installed. The known device is suited not only for monitoring whether a diagram disk has been inserted and the apparatus properly closed but also whether the recording pencils rest with sufficient recording pressure on the diagram disk to obtain satisfactory recordings.

30 The solution according to the parent application, according to which electrical contacts are attributed to the recording pencils and fastened adjacent the supporting and guiding surface of the diagram disk in such manner that such contacts can be operated only indirectly via the diagram disk, avoids the disadvantages of known monitoring devices and allows to attain the object with the most simple means. Contrary to monitoring devices in which the recording pencils are made themselves electrically conductive or in which levers connected thereto have to operate contacts, the monitoring device according to the above mentioned parent application is so designed that neither for mounting the contacts do modifications of the recording means and their mountings have to be carried through, nor are there any reactions on the recording pencils themselves during the monitoring due to an unfavourable leverage or a tilting moment on the recording pencils. A signal current is generated by contacting only when a diagram disk has been inserted in the tachograph. Apart from that the contacts may be adjusted so that it can be checked whether they rest on the diagram disk with the necessary recording pressure so that besides the monitoring whether a diagram disk has been inserted there is also a monitoring of the recording pressure and thereby whether recordings have been made.

35 Certain difficulties, however, result from the embodiment as shown in the parent application in that the movable foil contact which is susceptible to creasing may be easily damaged when inserting the diagram disk. Also contacting may be interrupted due to dirt, especially due to particles abraded by the recording process which accumulates between the foil contact and the firmly arranged counter contacts. These difficulties are also due to the fact that the foil contact, in order to be able to monitor the operation of all recording pencils, must extend over the whole radial recording range so that it must have a relatively large area. Considering the fact that a sufficiently

exact monitoring of the recording pencils may be achieved when the recording pressure of the pencils is checked only in their initial position an essential simplification 5 of the monitoring device may be achieved and the above mentioned difficulties reduced. In many cases it is quite sufficient to monitor only those recording pencils as to the required recording pressure which serve to 10 record the working times of the drivers as these recordings are known to be of special importance. The desired simplification of the monitoring device in this case is so much easier due to the fact that the recording 15 pencils for producing stepped recording lines or bar diagrams require a relatively small radial recording range only so that no large area contacts are required.

The aim of the present invention, therefore, 20 is that the monitoring device working on the principal as shown in Application 50877/74 (Serial No. 1,454,948) should be of such design and arrangement that there will be less disturbances as compared with 25 the embodiment described in the parent application. This means it should be safe against any unproper handling when inserting the diagram disk and against tampering, and contact interruptions due to a dirt 30 should be practically impossible.

According to the present invention there is 35 provided a device for monitoring the operation of recording means in a tachograph which is provided with means for supporting and guiding at least one time dependant drivable record carrier, and at least one elastically mounted recording pencil movable in a direction normal to the record carrier when the latter is supported by said 40 support means, wherein an indirectly operated pressure sensitive member is provided which is actuatable through the intermediary of the record carrier when the latter is supported by said support means to deliver 45 a signal current depending on the pressure exerted by the recording pencil on the record carrier and wherein the pressure sensitive member is arranged on the opposite side of said support means to the 50 guiding surface thereof and wherein a sensor is arranged adjacent to and in operative contact with the pressure sensitive member in the support means and protruding through the guiding surface thereof.

55 It is another advantageous feature of the device according to the invention that the pressure sensitive member preferably consists of a set of leaf spring contacts in a housing which is arranged within the pot-shaped lid of the tachograph.

60 This embodiment is not suited for a continuous monitoring, especially for a continuous monitoring of the speed recording pencil which moves over a relatively wide radial recording range, however, it provides for

an essentially sufficient monitoring in the rest position of the pencils when the vehicle is at a standstill. Apart from the fact that one may continuously monitor the presence of a diagram disk the embodiment as now proposed allows for a continuous monitoring of the functioning of the working time recording pencils which make only a very limited radial recording movement so that the monitoring may be realised with least technical expenditure. The set of spring contacts used is a mass produced commercially available article and its arrangement within the lid of the tachograph makes sure that many of the usual causes for disturbances, such as dirt and damage due to 70 improper handling, can be readily avoided. The device may also be easily exchanged since replacing or adding a set of contacts and the sensor attributed thereto especially with a corresponding design of the lid in production there will be no changes to be made on the tachograph nor will there be any adjustments necessary especially of the recording pencils.

In the following an embodiment of the invention will now be explained in detail with reference to the accompanying drawings. In these drawings

Fig. 1 is a diagrammatic section through the bottom of the lid of a tachograph, whilst

Fig. 2 is also a section along the line A—B in Fig. 1, however for a better illustration of the recording pencils, the diagram disk and the lid have been shown in an explosive 100 view.

In Fig. 1 the bottom 1 of the tiltable lid 2 of a tachograph has been shown. The arrow 3 is supposed to indicate the opening direction of the lid 2, it being known that the lid 2 is generally in the form of a pot which is articulated to the basic housing of the tachograph containing the measuring systems and the recording means. In the lid housing in the most simple case there is a clockwork mechanism, the indicating means for the time and the speed as well as for the distance covered, and suitable lighting means which, however, as being unessential for the invention, have not been shown for reasons of simplicity. The reverse side of the bottom 1 turned to the interior of the tachograph housing serves as a supporting and guiding surface 5 to the diagram disks 4 serving as a record carrier, only one such disk being shown in Fig. 1. A central opening 6 in the bottom 1 serves to take up the tensioning device (not shown) for the diagram disks which on its part is fastened on the output shaft of the clockwork and serves to connect the diagram disks to the shaft so that they are driven in the direction of the arrow P. The bottom 1 of the lid is also provided with a longitudinal recess 7 into which the points of the recording 110 115 120 125 130

5 pencils 8, 9, 10 protrude if no diagram disk has been inserted in the tachograph. The recording pencils 8, 9 and 10, of which the pencil 8 is the speed recording pencil the pencil 9 the distance recording pencil and the pencil 10 serves to record the working and other operational data, have been shown in Fig. 2 in their initial position, that means when the vehicle is at standstill. They are 10 under the action of springs which press them onto the diagram disk 4. Out of these springs only one spring 13 has been shown in Fig. 1 in connection with the working time recording pencil 10 which is tiltably arranged on a fixed portion 11 and may be 15 brought to the various recording positions by means of a control lever 12 or may be rotated to produce various bar diagrams. The other recording pencils are mounted in 20 similar manner in not shown recording levers which allow for a bigger radial recording range transverse to the transport direction of the diagram disk 4.

25 Associated with the work time recording pencil 10 there is a set 14 of contacts which in the most simple case consist of two preferably encapsulated leaf spring contacts 15 and 16. The highly elastic contact spring 15 is actuated by means of a sensor 17 30 mounted in the bottom 1, which sensor projects above the guide surface 5 of the diagram disk 4 when it is not actuated. As soon as a diagram disk has been inserted into the tachograph and the lid 2 closed 35 the properly functioning recording pencil 10 under the effect of the spring 13 depresses the diagram disk 4 and thereby the sensor 17 from the guide surface 5 of the diagram disk 4. In order to enlarge the switching 40 range the recess 7 in the supporting plane 5 is provided with slanted side faces 18 and 19. This means, as may be seen from Fig. 1, that the diagram disk may buckle into the recess 7 under the influence of the recording pencil, the slanted face 19 making 45 sure that the diagram disk leaves the recess 7 with the least possible friction.

50 As was already explained in the introductory portion of the specification, for many applications it is sufficient to monitor the work time recording pencils only since in this way it is possible to check whether a diagram disk has been inserted into the tachograph. As may be seen from Fig. 2 55 bores 20 and 21 may be applied which can be used to fasten additional sensors attributed to the recording pencils 8 and 9. To supplement the monitoring device in this manner additional sets 22, 23 of leaf spring contacts may be added in a building set 60 manner besides the already available set 14. Alternatively a suitable multiple set of contacts may be fastened to the interior of the lid 2. Naturally instead of sets of leaf spring contacts also other switching elements 65 may be used, for instance contacts which operate without touch. Also it is possible to use electrically conductive foils such as they have been shown in the parent application since on the one hand the switching distances of the sensors are relatively small and on the other hand the currents to be switched are not very big so that the conductive foils need no servicing.

70 The signal current delivered via the contact sets are treated in accordance with Fig. 4 of the parent application or when there is one set of contacts only in a correspondingly reduced and simplified circuit arrangement which has not been shown here for the sake of simplicity.

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1459368 **COMPLETE SPECIFICATION**

1 SHEET

*This drawing is a reproduction of
the Original on a reduced scale*

Fig. 1

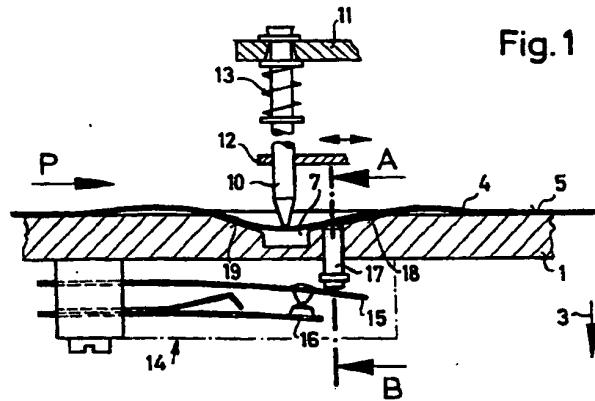


Fig. 2

